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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/802,165	03/08/2001	Byung-Jin Chun	678-623 (P9782)	6181

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EXAMINER
IQBAL, KHAWAR

ART UNIT	PAPER NUMBER
2686	

DATE MAILED: 01/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/802,165	CHUN ET AL.	
	Examiner	Art Unit	
	Khawar Iqbal	2686	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 November 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *6,9-25,27-31 and 35-43* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *6,9-24 and 33-35* is/are allowed.

6)☒ Claim(s) *25,27-31 and 36-43* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 25,27-31,36,38,40,42 are rejected under 35 U.S.C. 102(e) as being unpatentable by Kuwahara et al (6597679).

Regarding claim 25 Kuwahara et al teaches a mobile station device in a mobile communication system, comprising:

a forward processor for processing a received forward signal (col. 3, lines 13-31, col. 6, lines 13-62);

a forward fading estimator for estimating forward fading information of the forward signal for each path (col. 6, lines 13-62, col. 7, lines 1-43);

a forwarding fading encoder for combining the estimated forward fading information and encoding the combined forward fading information (col. 3, lines 13-65, col. 6, lines 13-62, col. 7, lines 1-43); and

a reverse processor for multiplexing the encoded forward fading information with a transmission message and feeding back the forward fading information in the multiplexed signal to a base station (col. 8, line39-col. 9, line 10, see above), wherein if

the forward signal forms an omnidirectional beam the forward fading estimator estimates complex forward fading information (col. 4, lines 10-40, col. 8, line 39-col. 9, line 10,).

Regarding claim 28 Kuwahara et al teaches wherein if the forward signal forms an omnidirectional beam the forward fading estimator estimates forward fading severity information (col. 4, lines 10-40, col. 8, line 39-col. 9, line 10).

Regarding claim 28 Kuwahara et al teaches wherein the forward fading estimator estimates complex forward fading information from the forward signal (col. 3, lines 13-65, col. 6, lines 13-62, col. 8, line 39-col. 9).

Regarding claim 29 Kuwahara et al teaches wherein the forward fading estimator estimates forward fading severity information from the forward signal (col. 3, lines 13-65, col. 6, lines 13-62, col. 8, line 39-col. 9).

Regarding claim 30 Kuwahara et al teaches wherein the reverse processor inserts the forward fading information into a predetermined reverse channel message for transmission (col. 3, lines 13-65, col. 6, lines 13-62, col. 8, line39-col. 9).

Regarding claim 31 Kuwahara et al teaches wherein the reverse processor transmits the forward fading information on a separately designated reverse channel (col. 3, lines 13-65, col. 6, lines 13-62, col. 8, line 39-col. 9).

Regarding claim 36 Kuwahara et al teaches a base station device that has an antenna array and received forward fading information from a mobile station in a mobile communication system, comprising:

a reverse processor for processing a reverse signal received through the antenna array; a forward fading information extraction unit for extracting forward fading information from the received reverse signal (col. 3, lines 13-32, col. 6, lines 13-63, col. 7, lines 1-43, col. 8, lines 39-50); a forward fading power calculator for calculating a forward fading power for each path based on the extracted forward fading information; an array vector calculator for calculating an array vector for each path from the reverse signal; a transmission correlation matrix calculator for calculating a transmission correlation matrix using the forward fading powers and the array vectors (col. 3, lines 13-32, col. 6, lines 13-63, col. 8, lines 39-50); a weight vector calculator for calculating a weight vector from the transmission correlation matrix, updating an existing weight vector with the calculated weight vector, and outputting the updated weight vector as a control signal to a transmission beam generator; and a forward processor comprising the transmission beam generator for generating a transmission beam for a transmission message based on the weight vector (col. 3, lines 13-32, col. 6, lines 13-63, col. 8, lines 39-50).

Regarding claim 38 Kuwahara et al teaches a base station device that has an antenna array and received forward fading information from a mobile station in a mobile communication system, comprising:

a reverse processor for processing a reverse signal received through the antenna array (col. 3, lines 13-67, col. 7, lines 1-43);

a forward fading information extraction unit for extracting forward fading information from the received reverse signal (col. 7, lines 1-43);

a forward fading power calculator for calculating forward fading power for each path based on the extracted forward fading information, calculating an average reverse fading power from the reverse signal, and selecting the forward fading power if the mobility of the mobile station is lower than a predetermined threshold and the average reverse fading power if the mobility of the mobile station is greater than the threshold (col. 2, lines 1-41, col. 4, lines 5-67, col. 5, lines 48-62, col. 6, lines 14-26, col. 8, lines 24-50);

an array vector calculator for calculating an array vector for each path from the reverse signal (col. 3, lines 13-65, col. 8, lines 24-50, see above);

a transmission correlation matrix calculator for calculating a transmission correlation matrix using the forward fading powers and the array vectors (col.8, lines 5-40);

a weight vector calculator for calculating a weight vector from the transmission correlation matrix, updating an existing weight vector with the calculated weight vector, and outputting the updated weight vector as a control signal to a transmission beam generator (col. 2, lines 1-41, col. 4, lines 5-67, col. 5, lines 48-62, col. 6, lines 14-26, col. 8, lines 24-50); and

a forward processor comprising the transmission beam generator for generating a transmission beam for a transmission message based on the weight vector (col.8, line 40-col. 9, line 11, see above).

Regarding claim 40 Kuwahara et al teaches a forward signal transmitting method for a base station that has an antenna array and received forward fading information from a

mobile station in a mobile communication system, comprising the steps of: extracting forward fading information from a reverse signal received through the antenna array; calculating a forward fading power for each path based on the extracted forward fading information (col. 3, lines 13-31, col. 6, lines 13-62, col. 7, lines 1-43); calculating an array vector for each path from the reverse signal; calculating a weight vector based on the forward fading powers and array vectors and updating an existing weight vector with the calculated weight vector; and forming a transmission beam for a transmission message based on the weight vector and outputting the transmission beam through the antenna array (col. 3, lines 13-31, col. 6, lines 13-62, col. 8, lines 25-55).

Regarding claim 42 Kuwahara et al teaches a forward signal transmitting method for a base station device that has an antenna array and received forward fading information from a mobile station in a mobile communication system, comprising the steps of:

extracting forward fading information from a reverse signal received through the antenna array (col. 7, lines 1-43); calculating forward fading power for each path based on the extracted forward fading information, calculating an average reverse fading power from the reverse signal, and selecting the forward fading power if the mobility of the mobile station is lower than a predetermined threshold and the average reverse fading power if the mobility of the mobile station is greater than the threshold; calculating an array vector for each path from the reverse signal (col. 9, lines 21-55, col. 10, lines 12); calculating a weight vector based on the forward fading powers and array vectors and updating an existing weight vector with the calculated weight vector (col. 9, lines 21-55, col. 10, lines 12); and forming a transmission beam for a

transmission message based on the weight vector and outputting the transmission beam through the antenna array (col. 3, lines 13-31, col. 6, lines 13-62).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 37,39,41 and 43 rejected under 35 U.S.C. 103(a) as being unpatentable over Kuwahara et al (6597679) and further in view of Ogawa et al (6590532).

Regarding claims 37,39 Kuwahara et al teaches a base station device that has an antenna array and received forward fading information from a mobile station in a mobile communication system, comprising (col. 2, lines 1-40):

a reverse processor for processing a reverse signal received through the antenna array (col. 3, lines 66-67);

a forward fading information extraction unit for extracting forward fading information from the received reverse signal (col. 3, lines 13-32, col. 6, lines 13-63, col. 7, lines 1-43, col. 8, lines 39-50);

a forward fading power calculator for calculating an average reverse fading power and a frequency from the received reverse signal and calculating a current forward fading power for each path by a predetermined prediction method based on a plurality of previous forward fading coefficients for each path, the average reverse

fading power, and the frequency (col. 3, lines 13-32, col. 6, lines 13-63, col. 8, lines 39-50);

an array vector calculator for calculating an array vector for each path from the reverse signal (col.3, lines 41-65, col. 8, lines 24-50, see above);

a transmission correlation matrix calculator for calculating a transmission correlation matrix using the forward fading powers and the array vectors (col.4, lines 30-65, see above);

a weight vector calculator for calculating a weight vector from the transmission correlation matrix, updating an existing weight vector with the calculated weight vector, and outputting the updated weight vector as a control signal to a transmission beam generator, and a forward processor comprising the transmission beam generator for generating a transmission beam for a transmission message based on the weight vector (col. 2, lines 1-41, col. 4, lines 5-67, col. 7, lines 1-43, col. 6, lines 13-63, col. 8, lines 39-50). Kuwahara et al teaches wherein if the forward signal forms a beam, the forward fading estimator estimates complex forward fading information and severity information (col. 3, lines 13-65, col. 6, lines 13-62, col. 7, lines 1-43 col. 8, line 39-col. 9). Kuwahara et al does not specifically teach Doppler frequency from the received reverse signal.

In an analogous art, Ogawa et al teaches a Doppler frequency from the received reverse signal (col. 21, line 63-col. 22, line 10,col. 23, lines 15-60). A radio device (1000) separates the signal from a specific terminal among from the signals from adaptive array antennas (1 to 4) according to a reception weight vector calculated by a

reception weight vector calculator (20). A reception coefficient vector calculator (22) derives an impulse response of a propagation path of the signal from the specified signal. A transmission coefficient vector inferring device (32) predicts the propagation path at the transmission time from the results of the inference by the reception coefficient vector (22). A transmission weight vector calculator (30) controls the antenna directivity at the transmission time according to the results of the prediction by the transmission coefficient vector inferring device (32). In such a way, the degradation of the error rate of the downstream line due to time difference between the upstream and downstream lines can be suppressed. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device of Kuwahara et al by specifically adding from the received reverse signal in order radio device which separates signal from specific terminal among from signals from adaptive array antenna.

Regarding claims 41,43 Kuwahara et al teaches a forward signal transmitting method for a base station device that has an antenna array and received forward fading information from a mobile station in a mobile communication system, comprising the steps of:

extracting forward fading information from a reverse signal received through the antenna array and storing the extracted forward fading information (col. 3, lines 13-31, col. 6, lines 13-62, col. 7, lines 1-43); calculating an average reverse fading power and a Doppler frequency from the received reverse signal and calculating a current forward fading power for each path by a predetermined prediction method based on a plurality

of previous forward fading coefficients for each path, the average reverse fading power, and the Doppler frequency (col. 3, lines 13-31, col. 6, lines 13-62, col. 7, lines 1-43); calculating an array vector for each path from the reverse signal; calculating a weight vector based on the forward fading powers and array vectors and updating an existing weight vector with the calculated weight vector(col. 9, lines 21-55, col. 10, lines 12); and forming a transmission beam for a transmission message based on the weight vector and outputting the transmission beam through the antenna array (col. 3, lines 13-31, col. 6, lines 13-62). Kuwahara et al teaches wherein if the forward signal forms a beam, the forward fading estimator estimates complex forward fading information and severity information (col. 3, lines 13-65, col. 6, lines 13-62, col. 7, lines 1-43 col. 8, line 39-col. 9). Kuwahara et al does not specifically teach Doppler frequency from the received reverse signal.

In an analogous art, Ogawa et al teaches a Doppler frequency from the received reverse signal (col. 21, line 63-col. 22, line 10,col. 23, lines 15-60). A radio device (1000) separates the signal from a specific terminal among from the signals from adaptive array antennas (1 to 4) according to a reception weight vector calculated by a reception weight vector calculator (20). A reception coefficient vector calculator (22) derives an impulse response of a propagation path of the signal from the specified signal. A transmission coefficient vector inferring device (32) predicts the propagation path at the transmission time from the results of the inference by the reception coefficient vector (22). A transmission weight vector calculator (30) controls the antenna directivity at the transmission time according to the results of the prediction by

the transmission coefficient vector inferring device (32). In such a way, the degradation of the error rate of the downstream line due to time difference between the upstream and downstream lines can be suppressed. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the device of Kuwahara et al by specifically adding from the received reverse signal in order radio device which separates signal from specific terminal among from signals from adaptive array antenna.

Allowable Subject Matter

5. Claims 6,9-24,33-35 are allowed. The following is a statement of reasons for the indication of allowable subject matter: As 6,9-24,33-35, the teaching of prior arts either alone or combine fail to teach all the limitations as recited claimed.

Response to Arguments

6. Applicant's arguments with respect to claims 37,39,41,43 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to KHAWAR IQBAL whose telephone number is 703-306-3015.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **BANKS-HAROLD, MARSHA**, can be reached at 703-305-4379.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9314 (for Technology Center 2684 only)

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist).

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

Khawar Iqbal

RAFAEL PEREZ-GUTIERREZ
PATENT EXAMINER
1/10/05